Rangia clam investigations in Texas bays: a growth-increment perspective

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Trees cored in year 2009

matching growth “bar codes”

to tree center

most recent increment (formed in 2009)
Pacific Geoduck: northeast Pacific Ocean

growth increments in hinge plate
Population age structure

Example: geoduck peel
1. geoduck an indicator of water temperature

2. long-lived: can use to hind-cast temperature
Freshwater mussels (Margaritifera, Gonidea)

mussel growth an indicator of river discharge (flow)
Rangia

Is *Rangia* growth or recruitment an indicator of temperature, flow, and / or salinity?

Questions to answer:

1) Longevity of *Rangia* in TX bays
2) Are growth increments well-defined and able to be measured?
3) Can growth chronologies be developed?
4) Can recruitment histories be developed?
5) If so, how do they relate to climate?
6) How does age-specific growth compare across bays? Between live- and dead-collected samples?
Rangia

General sampling locations

Mission Lake
Sabine Lake
Trinity Bay
Mission Lake
Rangia increments
Rangia size

Age-weight relationships

Trinity

Sabine

A) Mission

B) Trinity

C) Sabine
Rangia growth trajectories

![Graph showing growth trajectories of Rangia with age and growth-increment width](image-url)
Rangia growth trajectories

![Graph showing growth trajectories of Rangia over time. The graph plots Age (years) on the x-axis and Growth-increment width (mm) on the y-axis. Three different species are represented: Sabine, Trinity, and Mission. The data points show the growth patterns and variability for each species.](image-url)
Rangia live individuals
Rangia climate

Temperature: No
Flow: No
Salinity: Yes
Rangia climate

![Graph showing normalized index and increment index over years with regression line and coefficient of determination](image_url)
Rangia recruitment

- **Sabine**
  - Frequency (n): 0, 2, 4, 6, 8

- **Trinity**
  - Frequency (n): 0, 5, 10, 15, 20

- **Mission**
  - Frequency (n): 0, 2, 4, 6, 8
Conclusions

1) Live *Rangia* are presently uncommon
2) No growth difference between live and dead shells
3) East (slow) to west (fast) gradient in growth
4) Growth synchrony within and among sites
5) Growth anomalies + correlate to salinity anomalies
6) Correlations strongest in fall when salinities highest
7) Recruitment history short and coarse
8) Environmental correlated for shell growth may be different than those for recruitment
Future directions

Middens? Rivers?
Oaks, elms, and drought